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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/967,184	09/28/2001	Heikki Heikkila	14766	5971

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EXAMINER

MCINTOSH III, TRAVISS C

ART UNIT	PAPER NUMBER
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1623

DATE MAILED: 04/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

File Copy

Office Action Summary

Application No.

09/967,184

Applicant(s)

HEIKKILA ET AL.

Examiner

Traviss C McIntosh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 April 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-49 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-49 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3 & 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Detailed Action

Specification

The abstract of the disclosure is objected to because the current abstract fails to enable the reader thereof to ascertain quickly the character and nature of the invention, and fails to include that which is novel in the art to which the invention pertains. Correction is required. See MPEP § 608.01(b).

Claim Objections

Claim 2 is objected to because of the following informalities: the word **containing** was misspelled as **containing**. Appropriate correction is required.

Claim 13 is objected to because of the following informalities: the word **butyl** has been misspelled as **buthyl**, and there is a comma missing between “butyl acrylate” and “methyl methacrylate”. Appropriate correction is required.

Claim 22 is objected to because of the following informalities: there is improper punctuation used at the end of the sentence. The sentence ends with a “.” not just a period. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-49 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, it is unclear what is meant by “a method for recovering a monosaccharide selected from the group consisting of rhamnose, arabinose, xylose, and **mixtures thereof...**”. The claim reads as a method for recovering a monosaccharide, or **one** monosaccharide, but then states that mixtures of the three monosaccharides can be recovered. It is noted that the examiner has interpreted the claim as set forth in the claim, and the ambiguity of which specific monosaccharide from a mixture of monosaccharides applicant regards as the recovered monosaccharide should be clearly set forth or the term “mixture” should be deleted.

Likewise, claim 2 additionally has the incorporation of “feeding the solution containing a monosaccharide selected from the group consisting of rhamnose, arabinose, xylose, and **mixtures thereof...**”. It is unclear how a monosaccharide can be a mixture of three monosaccharides. Applicants are requested to employ proper Markush terminology, wherein the phrase “selected from the group consisting of” represents conventional terminology.

Claim 1 provides for the use of a weakly acid cation exchange resin for chromatographic separation, but, since the claim does not set forth any additional steps involved in the method/process for the recovery of a monosaccharide, it is unclear what methodological steps applicant is intending to encompass. The claims are indefinite where they recite a single step, while requiring multiple active, positive steps.

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Claim 2 recites the limitation "**the solution containing a monosaccharide**" in the first and second lines. There is insufficient antecedent basis for ~~this~~ limitation in the claim. Claim 1 only provides "a solution containing **at least two ... monosaccharides.**"

Claim 5 is indefinite wherein the claim has gaps or omissions of text in the areas "the method of claim 1 where the...". It is unclear if text intended to be incorporated in the claim is missing. Text "deleted" using white-out is not a proper mode of facilitating an amendment to the claims.

Claim 7 is indefinite wherein the claim reads "the solution containing rhamnose is a **xylose process stream or side stream**". It is unclear what applicant intends by this recitation.

Claim 8 is indefinite wherein the claim reads "the method of claim 5 wherein an arabinose rich fraction is separated and recovered", yet claim 5 limits the monosaccharide which is recovered to rhamnose. If this limitation of "an arabinose rich fraction is separated and recovered" is intended as an additional step, it is unclear when this is to be performed. Likewise, claim 9 limits claim 8 to L-arabinose, and is unclear by this recitation for the same reasons.

Claim 10 is indefinite wherein the claim reads "the method of claim 5 wherein a xylose rich fraction is separated and recovered", yet claim 5 limits the monosaccharide which is recovered to rhamnose. If this limitation of "a xylose rich fraction is separated and recovered" is intended as an additional step, it is unclear when this is to be performed. Likewise, claim 11 limits claim 10 to D-xylose, and is unclear by this recitation for the same reasons.

Claim 13 is indefinite wherein it is unclear what the acrylic resin is derived from due to the confusing Markush group. The claim reads "the acrylic resin is derived from the group consisting of methyl acrylate, ethyl acrylate, butyl acrylate, methyl methacrylate **and**

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acrylonitrile **and** acrylic acids **and** mixtures thereof". It is unclear if acrylic acids and mixtures thereof are intended as part of the Markush group or if these are separate and requisitely combined limitations. In other words, must methyl methacrylate and acrylonitrile and acrylic acids and mixtures all be used together? Conventionally, Markush members are set forth alternatively as equivalents, unless combined as an equivalent.

Claims 14 and 15 claim "wherein the resin is in the form selected from the group consisting of Na^+ , Mg^{2+} , H^+ , and Ca^{2+} ". It is unclear how the resin can be in the form of an ion. The resin may have these ions incorporated therein, but it is unclear how a resin can be an ion.

Claims 18, 27, and 28, which all ultimately depend from claim 1, all recite the limitation "the eluant" in the first line. There is insufficient antecedent basis for this limitation in the claims as there is no recitation of eluant in claim 1.

Claim 19 is indefinite wherein the claim reads "feeding **the solution containing rhamnose** to a first chromatographic column and then feeding **a fraction** from the first...". It is unclear what is intended by **the solution containing rhamnose**. The only solution in claim 1 is a "solution containing at least two monosaccharides", which optionally has rhamnose. There is no clear and definite indication of that which is "the solution containing rhamnose". Additionally, it is unclear as to what is intended by a fraction. This could be feeding a fraction of the gel, a fraction of the eluant or a fraction of the starting solution used.

Claims 20-26 also include the use of "a fraction" or "the fraction". All claims are indefinite which contain these recitations without particularly pointing out the identity of the fraction.

they said
it is
clear that
it is
fractions from
the starting
solution...
if this is
the case, you
just put the
starting solution
into different
columns.

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Claims 31-33 recite the limitation "the pH of the feed solution is..." in the first line. There is insufficient antecedent basis for this limitation in the claim as there has been no indication in any of the claims from which these depend of any feed solution.

Claims 34 and 35 are indefinite wherein the claims read "recovering from the first and the second chromatographic column-xylose and arabinose". It is unclear if xylose and arabinose are collected from the first column and xylose and arabinose are collected from the second column, or if xylose is collected from the first and arabinose is collected from the second.

Claim 36 is indefinite as it is unclear when this step is to be performed.

Claims 37 and 38 recite the limitation "the third column" in the second line. There is insufficient antecedent basis for this limitation in these claims as there are only two columns in the claims from which these claims depend.

Claims 39-41 are indefinite as it is unclear when these steps are to be performed.

Claim 43 depends from claim 1 and is indefinite wherein the claim provides the limitation that "the rhamnose fraction is collected before the other saccharides". It is unclear what is meant by this in the claim, as this would imply the method provides steps of collecting one monosaccharide, then collecting another solution of saccharides, yet claim 1 is drawn to a method of recovering a monosaccharide and has no additional steps involved with when a saccharide or when other saccharides are to be collected.

Claim 44 depends from claim 1 and is indefinite wherein the claim provides the limitation that "the rhamnose fraction is collected after the other saccharides". It is unclear what is meant by this in the claim, as this would imply the method provides steps of collecting one monosaccharide, then collecting another solution of saccharides, yet claim 1 is drawn to a

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method of recovering a monosaccharide and has no additional steps involved with a saccharide or when other saccharides are to be collected.

Claims 43 and 44 recite the limitation "other saccharides" in the second line. There is insufficient antecedent basis for this limitation in these claims. Nowhere in these claims, or claim 1, which both depend from, is there a recitation of collecting saccharides, which could be any monosaccharide, oligosaccharide, or polysaccharide.

Claim 48 is indefinite wherein the claim limits the sequential moving bed system of claim 47 to a continuous moving bed system, and it is unclear how the moving bed system can be both sequential and continuous.

The terms "strongly" and "weakly" in all instances are relative terms which renders the claims indefinite. The terms "strongly" and "weakly" are not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Additionally, strong and weak are relative terms of degree, wherein these terms should be particularly pointed out by the pH's which are intended. A strong acid exchange system in one's process could be considered a weak acid exchange system when compared to another system in an alternative method.

All claims which depend from an indefinite claim are also indefinite. *Ex parte Cordova, 10 U.S.P.Q. 2d 1949, 1952 (P.T.O. Bd. App. 1989).*

The closest prior art appears to be Heikkila et al. (US Patent 5,998,607) who discloses the separation of xylose from a cooking liquor using a slightly acid cation-exchange resin and

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Blaschek et al. ("Complete Separation and Quantification of Neutral Sugars from Plant Cell Walls and Mucilages by High-Performance Liquid Chromatography", Journal of Chromatography, 256 (1983), pp. 157-163) who discloses methods of separating L-rhamnose, L-arabinose, D-xylose, D-mannose, D-galactose, and D-glucose using multiple chromatography runs.

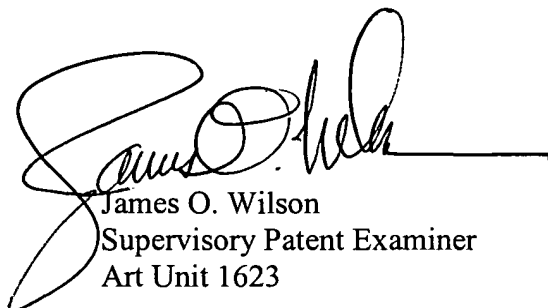
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Traviss McIntosh whose telephone number is 703-308-9479. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James O. Wilson can be reached on 703-308-4624. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3014 for regular communications and 703-305-3014 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0196.

Traviss C. McIntosh
April 7, 2003



James O. Wilson
Supervisory Patent Examiner
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